Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 19 (1): 127–131
https://doi.org/10.15560/19.1.127

PENSOFT

Metamasius hemipterus (Linnaeus, 1758) (Coleoptera, Curculionidae, Dryophthorinae) on a hand of bananas in Greece

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Abstract

A dead individual of *Metamasius hemipterus* (Linnaeus, 1758) was collected by a citizen scientist in Athens, Greece from a hand of imported bananas. The equatorial origin of the fruit as well as the extensive growth of a fungus on the specimen, both suggest an unintentional introduction as a contaminant. Nevertheless, this record highlights the valuable contribution of citizen scientists in the study of alien species. Although the species is not presently considered as established in the country, citizen-science initiatives in order to raise awareness and monitor its presence are ongoing.

Keywords

Alien species, biological invasions, citizen science, contaminant, Rhynchophorini, West Indian Sugarcane Weevil

Academic editor: Kirill Makarov | Received 7 July 2022 | Accepted 12 October 2022 | Published 27 February 2023

Citation: Demetriou J, Koutsoukos E, Kazilas C, Kalaentzis K, Georgiadis C (2023) *Metamasius hemipterus* (Linnaeus, 1758) (Coleoptera, Curculionidae, Dryophthorinae) on a hand of bananas in Greece. Check List 19 (1): 127–131. https://doi.org/10.15560/19.1.127

Introduction

The number of alien species across the globe has been rising with no signs of saturation, mainly due to international trade and human movements (Hulme et al. 2009; Seebens et al. 2017). In Europe, terrestrial invertebrates have been most frequently introduced to the continent as contaminants on plants, food, and nursery material (Pergl et al. 2020), while insects comprise the lion's share of alien terrestrial invertebrates (Roques 2010).

In Greece, a total of 469 alien insects have been identified thus far, including a large number of beetles associated with plant material and stored products (Demetriou et al. 2021). Among the comprehensive catalogue of alien insects of Greece, 10 weevil species of the family Curculionidae have been identified, while five of those belong

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to the subfamily Dryophthorinae. These species include the Red Palm Weevil *Rhynchophorus ferrugineus* (Olivier, 1790) (Kontodimas et al. 2006) and the Agave Weevil *Scyphophorus acupunctatus* Gyllenhaal, 1838 (Kontodimas and Kallinikou 2010) affecting palm trees and *Agave americana* L., respectively. In addition, the turf grass pest *Sphenophorus venatus* (Say, 1831) (Korotyaev and Apt 2018), as well as two insects of stored commodities, the Rice Weevil *Sitophilus oryzae* (Linnaeus, 1763) (Buchelos and Athanassiou 1993) and the Maize Weevil *Sitophilus zeamais* (Motschulsky, 1855) (Athanassiou and Buchelos 2001) have also been recorded in Greece.

Metamasius hemipterus (Linnaeus, 1758) is a species of Neotropical origin is distributed across the Caribbean and Central America, reaching the northern part of South America (Vaurie 1966). Nevertheless, this species has been unintentionally transported outside its native range and established in Africa (Lepesme and Paulian 1941; Medler 1980; Nonveiller 1984) and North America (Woodruff and Baranowski 1985; Thorn et al. 2019) (Fig. 1; CABI 2022). Furthermore, *M. hemipterus* has been intercepted from Australia (Tryon and Benson 1920; EPPO 2021) as well as from Europe, in the Netherlands and the United Kingdom (Whitehead 1991; EPPO 2006). Most of the interceptions of *M. hemipterus* have occurred on plant material and particularly on bananas (Molet 2013).

The species is a known pest of bananas (*Musa* spp.) and sugarcane (*Saccharum* spp.) although it has also been associated with a wide range of tropical fruit (e.g. coconuts, guavas, maize, mangoes, papayas, pineapples) and ornamental plants (e.g. lantanas, palms) (Vaurie 1966). Thus, *M. hemipterus* has been identified as an economic threat to banana and sugarcane cultivations (Woodruff and Baranowski 1985; Sosa et al. 1997; Molet 2013) and has been managed alongside the Banana Weevil *Cosmopolites sordidus* (E.F. Germar, 1823) using botanical pesticides (Tinzaara et al. 2006), entomopathogenic nematodes (Giblin-Davis et al. 1996; Nankinga and Moore 2000), the entomopathogenic fungus *Beauveria bassiana* (Peña et al. 1995; Tinzaara et al. 2007), and pheromone-based trapping (Alpizar et al. 2012).

Methods

On October 19, 2021, photographs of an unknown weevil found on a hand of bananas were posted on the Facebook group "Insects of Greece and Cyprus" by Simos Paschalidis (Fig. 2). The dead weevil specimen was observed by the stem of a banana cluster, covered in fungus. Upon communication of the Alientoma research team (Kalaentzis et al. 2021a, 2021b) with the citizen scientist, the specimen was sent to the Department of Biology, National and Kapodistrian University of Athens for further examination and identification.

Results

***Metamasius hemipterus* (Linnaeus, 1758)**
Figure 2

Material examined. GREECE – **Attiki** • Athens, Sepolia; 37.9974°N, 023.7121°E; 18.X.2021; S. Paschalidis leg.; on imported bananas bought from street market; ZMUA COL 00002775 (Fig. 3).

Identification. The specimen can be differentiated from other genera similar in morphology following the taxonomic remarks of Vaurie (1966: 230) as well as information from Anderson (2002, 2021). Its distinctive color pattern and ecological preferences deem the specimen

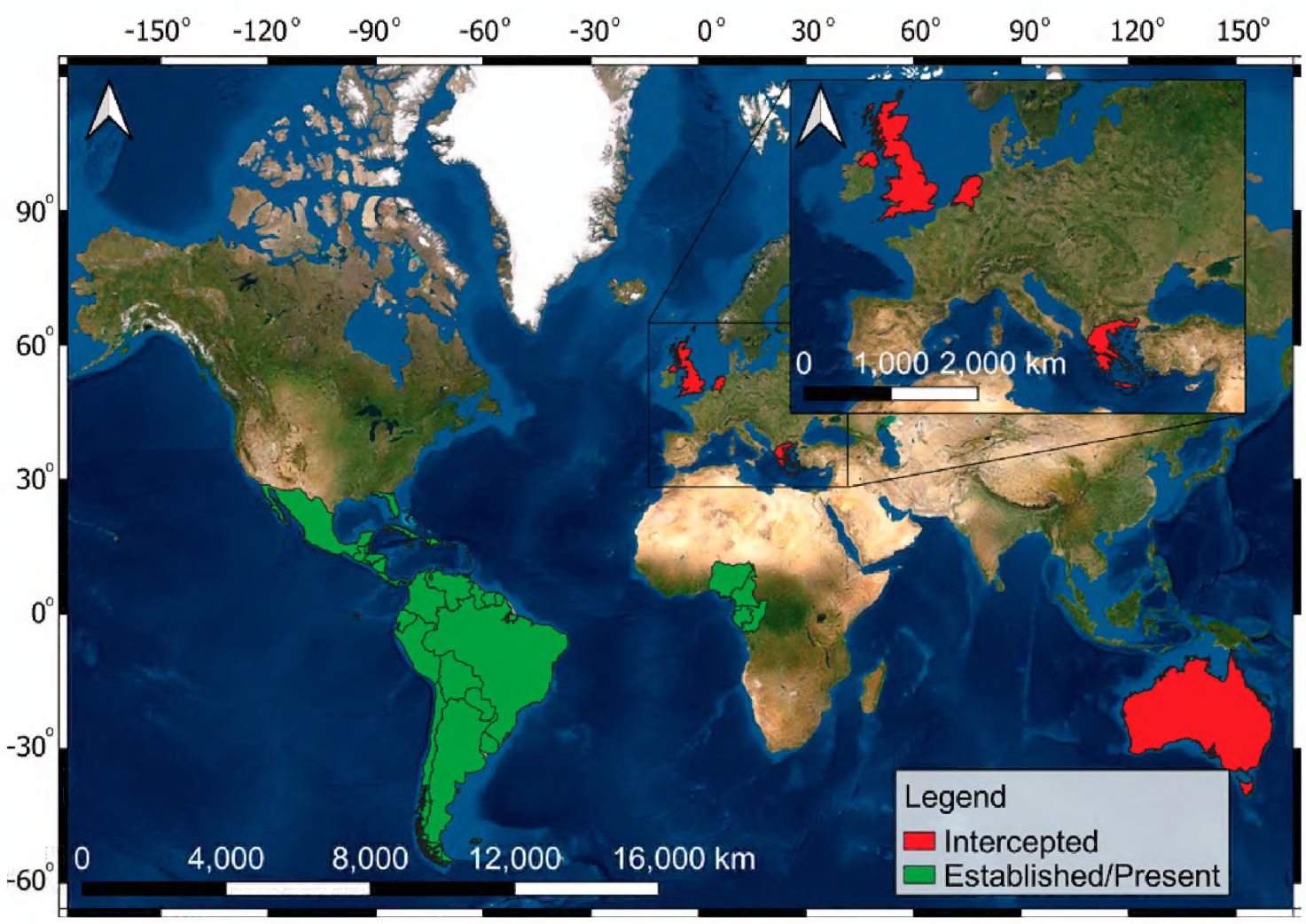

Figure 1. Distribution map for *Metamasius hemipterus* (Linnaeus, 1758). Based on CABI (2022).

Figure 2. The insect as found on the hand of bananas. Photograph by Mr. Simos Paschalidis.

difficult to be confused with other taxonomically or morphologically related taxa present in Greece, such as *Rhynchophorus ferrugineus*, an alien weevil species that can be also found in Greece, which is much larger and broader (*R. ferrugineus* 2–4 cm compared to 0.9-14.0 cm in *M. hemipterus*) in shape compared to *M. hemipterus*.

Discussion

Metamasius hemipterus is not considered to be established in Greece. The most probable hypothesis of its introduction is unintentional transportation as a contaminant on bananas from Ecuador. This assumption is supported both by the origin of the bananas (mentioned on the fruit), as well as the extensive coverage of the specimen in fungus. The fungus was identified as *Beauveria* (*Cordyceps*) *bassiana* (Bals.-Criv.) Vuill. (NCBI similarity 99.72%), used for the management of weevils attacking banana cultivations (Peña et al. 1995; Tinzaara et al. 2007). We believe bananas were either sprayed with entomopathogenic fungi prior to their export or planted in areas with naturally occurring strains of *Beauveria* sp., causing the infection and eventual death of the collected *M. hemipterus* specimen, which was subsequently imported to Greece. Nevertheless, the presence of living individuals could be further monitored by the phytosanitary authorities and assisted by citizen scientists in order to prevent the establishment of *M. hemipterus*, as this could potentially affect banana cultivations, ornamentals such as *Lantana camara* L., *Phoenix canariensis* H.Wildpret and *Washingtonia robusta* H.Wendl., agricultural crops (e.g. maize, sorghum) (Vaurie 1966) or native plants such as *Phoenix theophrasti* Greuter,

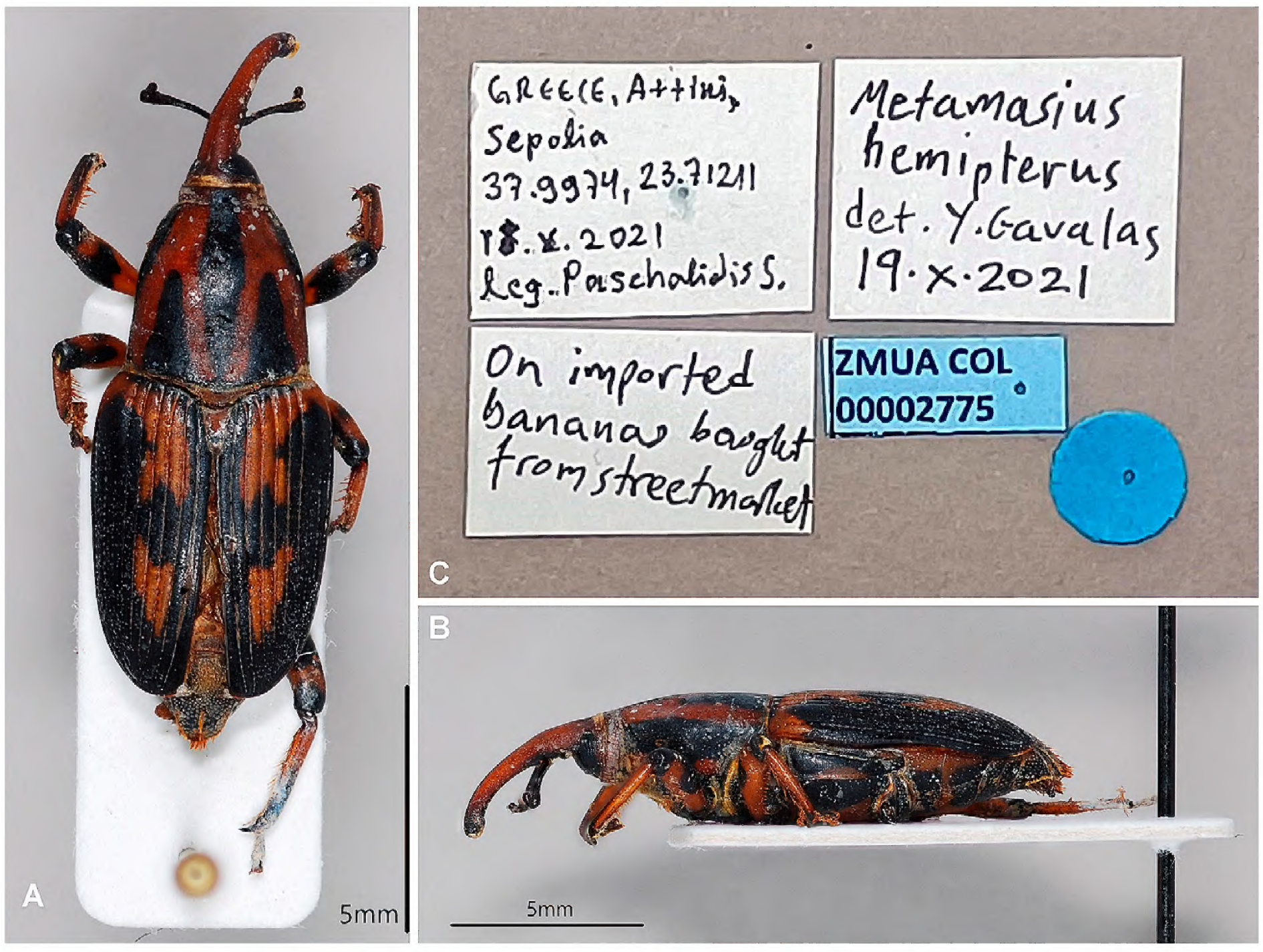

Figure 3. Habitus of *Metamasius hemipterus* (Linnaeus, 1758), ZMUA COL 00002775. **A.** Dorsal view. **B.** Lateral view. **C.** Labels associated with the specimen. The blue circle indicates a specimen from Greece (ZMUA internal color coding).

already under attack by *R. ferrugineus* (Melita et al. 2017). This record underlines the importance of citizen science in detecting new records of alien species as well as deciphering their introduction pathways and adverse impacts.

Acknowledgements

We are kindly thankful to Mr. Simos Paschalidis for the collection and provision of the specimen. We are also thankful to Mr. Yiannis Gavalas for his comments on the identification of the species and Dr. Dimitrios N Avtzis (Forest Research Institute, Hellenic Agricultural Organization Demeter) for his comments, suggestions, and corrections to the manuscript during the review process. Finally, we give many thanks to Dr. Vassili N. Kouvelis and Mrs. Alexandra M. Kortsinoglou for their assistance in identifying the fungus species. The APCs were covered by the Special Account for Research Grants of the National and Kapodistrian University of Athens.

Authors' Contributions

Conceptualization: JD, EK, CK, KK. Data curation: CG, KK, CK, EK. Funding acquisition: CG. Validation: CG, JD. Writing - original draft: JD, EK, CK, KK. Writing - review and editing: JD, CG.

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